INSTALLATION RESTORATION PROGRAM

LANDFILL LF-022
PROPOSED REMEDIAL ACTION PLAN

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

DRAFT FINAL

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1.0 INTRODUCTION

This **Proposed Remedial Action Plan (PRAP[1])** recommends a method of dealing with contamination from Landfill LF-022 at Plattsburgh Air Force Base (AFB) in Plattsburgh, New York (Figure 1). The U.S. Air Force is proposing this **remedial action** plan, or preferred **remedial alternative**, to address **source** material (i.e., contaminated soil and landfilled waste) and **groundwater** contamination at LF-022. The preferred alternative is one of three remedial alternatives evaluated in detail during the Landfill LF-022 **Feasibility Study (FS)** prepared as part of the Department of Defense's (DOD) **Installation Restoration Program (IRP)** at the base.

This PRAP is being published in accordance with Section 117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**. Its purpose is to summarize the results and conclusions of the FS, providing information so the public can review and comment on the remedial alternatives being considered for the LF-022 site. The U.S Air Force, in consultation with the U.S. Environmental Protection Agency (USEPA) and the New York State Department of Environmental Conservation (NYSDEC), will consider public input while selecting the final remedial alternative for LF-022.

This PRAP addresses contamination believed to result from previous disposal activities at Landfill LF-022 (Figure 2). Reportedly active from 1959 to 1966, Landfill LF-022 received domestic wastes from Plattsburgh AFB. A **Remedial Investigation (RI)** at LF-022 identified contaminants in surface and subsurface soils, waste, and groundwater.

Plattsburgh AFB's preferred remedial alternative includes institutional controls, installation of a soil and vegetative **cover system** over the landfill, and conducting a **long-term monitoring** program to evaluate the status of groundwater quality.

The preferred remedial alternative is detailed further in Section 6.0 of this document.

This PRAP:

- Explains the opportunities for public comment on the remedial alternatives (Section 2.0);
- Includes a brief history of the site and the principal findings of site studies (Section 3.0);
- Summarizes the site risks identified in the RI (Section 4.0);
- Identifies the remedial response objective developed in the FS to address site risks (Section 5.0);
- Briefly describes the preferred alternative (Section 6.0);

[1]To make this discussion more easily understandable, technical terms highlighted in bold print are defined in the glossary at the end of this document.

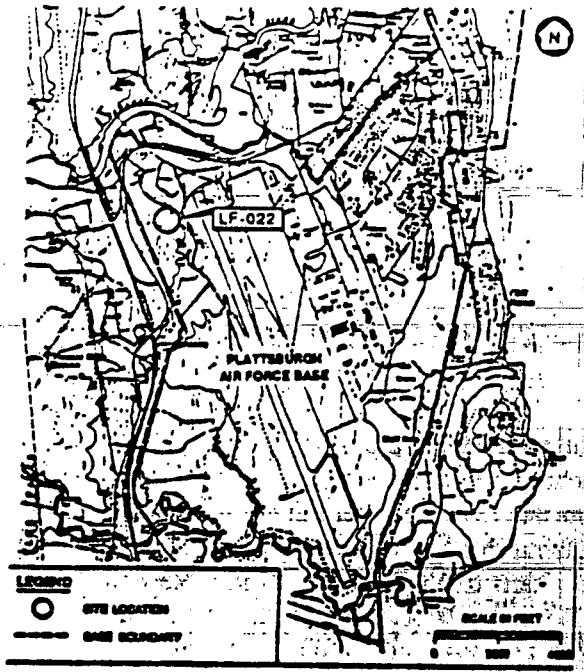

FIGURE 1: Location Map

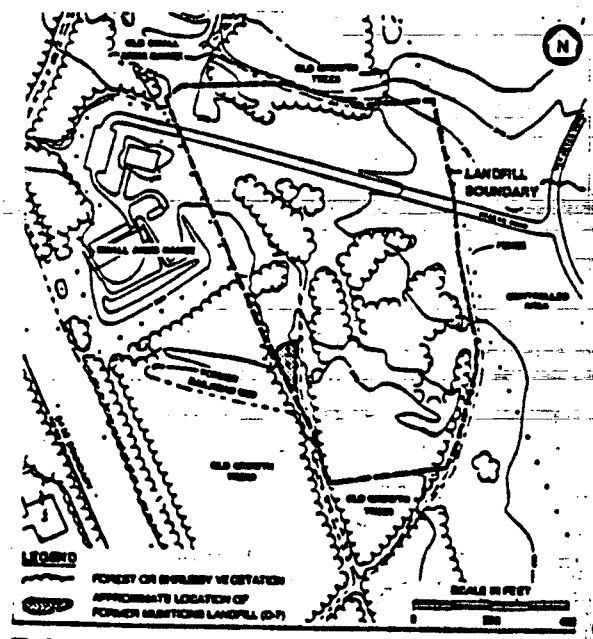

FIGURE 2: LF-022 Site Features

- Briefly describes the other two alternatives evaluated in the FS (Section 7.0)
- Outlines the criteria used by Plattsburgh AFB to propose a remedial alternative for the site, and briefly analyzes the degree to which the three alternatives meet the criteria (Section 8.0); and
- Presents Plattsburgh AFB's rationale for its recommended alternative (Section 9.0).

2.0 THE PUBLIC'S ROLE IN EVALUATING REMEDIAL ALTERNATIVES

The following paragraphs explain how you can become involved in the alternative selection process after reviewing this PRAP.

2.1 PUBLIC COMMENT PERIOD

Plattsburgh AFB is holding a 30-day public comment period, from July 21, 1992 to August 20, 1992, to solicit public input. During this period, the public is invited to review and comment on this PRAP, the Landfill LF-022 FS and RI reports, and comment on the remedial alternatives. The full-length reports are available in the Information Repository at:

Plattsburgh Public Library
15 Oak Street (corner of Oak and Brinkerhoff)
Plattsburgh, NY 12901
(518) 563-0921

Hours:

Monday, Wednesday, and Thursday:
9 a.m. to 8 p.m.
Tuesday, Friday, and Saturday: 9 a.m. to 5 p.m.

The repository documents are on reserve (see the Reference Librarian). Photocopying equipment is available.

2.2 PUBLIC INFORMATIONAL MEETING AND PUBLIC HEARING

Plattsburgh AFB will host a public meeting at 7:00 p.m., on July 21, 1992, at the Plattsburgh AFB Hospital, in Plattsburgh, New York. The public is encouraged to attend this presentation about the various remedial alternatives, and to ask questions. Immediately after this presentation, Plattsburgh AFB will hold a formal Public Hearing to accept comments about the remedial alternatives being considered for Landfill LF-022. This hearing will provide the opportunity for people to comment officially on the remedial plan. Public comments will be recorded and transcribed, and a copy of the transcript will be added to the Administrative Record available at Plattsburgh AFB.

2.3 WRITTEN COMMENTS

If you would like to submit written comments about Plattsburgh AFB's preferred alternative, any of the other remedial alternatives being considered, or issues relevant to the site remediation, please deliver your comments to Plattsburgh AFB's IRP Public Affairs Coordinator at the Public Hearing or mail your written comments (postmarked no later than August 20, 1992) to:

IRP Public Affairs Coordinator
380 ARW/PA
Building 100
Plattsburgh AFB, NY 12903-5000
(518) 565-7006

2.4 PLATTSBURGH AFB'S REVIEW OF PUBLIC COMMENT

Public comments are part of the process of reaching a final decision on the most appropriate remedial alternative for LF-022. Plattsburgh AFB's final choice of a remedial alternative will be issued in a Record of Decision (ROD) for the site and submitted to USEPA and NYSDEC for review, approval, and signature. A Responsiveness Summary of Plattsburgh AFB's responses to public comments will accompany the ROD. Once the ROD is signed, it becomes part of the Administrative Record.

3.0 BASE AND SITE HISTORY

Plattsburgh AFB is in northeastern New York State, bordered on the north by the City of Plattsburgh and on the east by Lake Champlain. The base is approximately 26 miles south of the Canadian border and 167 miles north of Albany. As part of the IRP, Plattsburgh AFB has initiated activities to identify, evaluate, and clean up identified hazardous waste sites. On November 21, 1989, Plattsburgh AFB was put on the National Priorities List of hazardous waste sites to be remediated under the direction of USEPA.

3.1 SITE HISTORY

Landfill LF-022 covers an area approximately 500 feet wide and 1,200 feet long on the western side of Plattsburgh AFB, about 500 feet from the base boundary. Active from 1959 to 1966, LF-022 received base domestic wastes (typically bagged household garbage). Reportedly, landfill operations consisted of digging 25-foot-deep trenches, spreading and burning trash in the trenches, and covering the remnants with sandy soil. Trees and brush now cover most of LF-022.

Several studies were conducted at LF-022 as part of the IRP program. A Preliminary Assessment to identify whether the site could be contaminated did not turn up any evidence of hazardous material having been dumped in the landfill. But because of the large size of the landfill and the potential for hazardous material to have been disposed of in it, a Site Inspection (SI) was made to confirm the presence or absence of contamination at LF-022. SI activities included a magnetometer survey and soil, waste, and groundwater sampling. Empty 55-gallon drums and 5-gallon containers were discovered during the SI, and inorganic compounds and petroleum hydrocarbons were detected in samples of waste and soil. A sign was discovered indicating that the area might have been used for sludge disposal.

3.2 RESULTS OF THE REMEDIAL INVESTIGATION

An RI in the fall of 1989, with supplemental sampling a year later, characterized the nature and extent of contamination at LF-022. RI activities included topographic and geophysical surveys, and groundwater and surface soil sampling. More rusted and empty 55-gallon drums and 5-gallon pails were uncovered during the RI. Field activity findings are summarized below.

3.2.1 Landfill Depth and Areal Extent

The LF-022 surface area is approximately 566,000 square feet. Although the landfill is 25 feet deep in some locations, the volume of fill material is difficult to estimate because of the nonuniform way wastes were disposed of. Based on the landfill area and a 25-foot depth, the maximum volume of fill material would be approximately 524,000 cubic yards.

3.2.2 Nature and Extent of Contamination

Chemical analysis detected contaminants in samples of surface soil, subsurface soil, waste, and groundwater (see Table 1). The pesticide DDT (dichlorodiphenyltrichloroethane) and its breakdown products DDD and DDE (dichlorodiphenyldichloroethane and dichlorodiphenyldichloroethene) were identified as surface soil contaminants, and might have been present in the fill material used at the site. The main contaminants detected in the buried waste (which is mostly burned household trash) were carbon tetrachloride, chloroform, bis(2-ethylhexyl)phthalate (BEHP), petroleum hydrocarbons, and 10 inorganic compounds (e.g., aluminum, copper, iron). Lead was found in subsurface soil just below the waste.

Iron and manganese were detected in site groundwater at concentrations exceeding

New York State groundwater quality and drinking water standards; however, associated risks are acceptable. The landfill's age, the types of wastes, and the practice of burning the wastes may have fostered anaerobic conditions in LF-022 groundwater, which could increase the solubility of iron and manganese naturally occurring in site soils within the saturated zone. However, it is also possible that iron and manganese are migrating vertically to groundwater from LF-022 wastes. The horizontal migration of contaminants appears limited.

4.0 SUMMARY OF SITE RISKS

A baseline risk assessment was conducted as part of the RI to evaluate whether site contaminants in groundwater, surface soil, and subsurface soil/waste pose a risk to humans and/or ecological receptors such as mammals, birds, and fish. Currently, exposure to surface soil is the only way people or animals could come into contact with LF-022 contaminants.

All human health risks are within acceptable USEPA risk standards, with one exception: a future child resident who trespasses on the site and is simultaneously exposed to maximum concentrations of soil contaminants (e.g., pesticides) and groundwater (e.g., manganese) via direct contact and ingestion, and vapors and fugitive dusts from the landfill via inhalation. This scenario is not considered a significant health risk because (1) simultaneous direct contact and ingestion of soil and groundwater, and inhalation of vapors and fugitive dusts is unlikely, and (2) manganese is essential to the human diet, and its intake, even at the maximum detected concentration, is within the safe daily intake ranges for children.

The ecological risk assessment indicated that current and future effects to terrestrial wildlife may occur from exposure to surface soil contaminants in the site's northwest and southeast quadrants. These potential effects are expected to be limited to individual creatures, not wildlife populations.

Based on the baseline risk assessment, it was concluded that LF-022 remedial alternatives should be developed to address potential current and future ecological risks associated with surface soil exposures.

5.0 PROPOSED REMEDIAL OBJECTIVE

Using information gathered during the RI and baseline risk assessment, Plattsburgh AFB identified a remedial objective for LF-022 against which the alternatives were compared in the FS:

- Minimize potential current and future ecological risks associated with exposure to pesticides in surface soil.

6.0 PLATTSBURGH AFB'S PREFERRED ALTERNATIVE

Plattsburgh AFB's recommendation of a preferred remedial alternative for LF-022 results from a comprehensive screening and evaluation process. The LF-022 FS

report details the alternatives that were considered, as well as the process and criteria used by the base in narrowing the list. Section 7.0 of this report briefly describes alternatives other than the preferred one.

Plattsburgh AFB recommends Alternative 2, Site Grading and Vegetation Establishment for Closure. To protect ecological receptors at the site, the base's preferred alternative is to place 12 inches of soil over the landfill, planted with grass. Alternative 2 consists of the following major components:

(1) Clear and grub the site

(2) Manage surface water runoff to minimize erosion of the final cover and minimize maintenance requirements

(3) Establish a cover thickness

(4) Establish vegetation to minimize erosion of the final cover and enhance evapotranspiration

(5) Develop a post-closure plan to monitor, maintain, and inspect the site

(6) Monitor groundwater

(7) Conduct five-year site reviews

Existing vegetation such as trees and brush would be cut, chipped, and removed from the site. The cleared site would be suitably regraded to control rainwater runoff and minimize erosion. Because the existing organic soil layer is thin or nonexistent over most of the landfill, additional soil is needed. Six inches of compacted common borrow covered by 6 inches of topsoil will be laid down to support grass growth, which, through evapotranspiration, will reduce the amount of precipitation reaching the buried waste. Consequently, the potential for contaminants to migrate from buried waste will be reduced. Additional fill for design subgrade elevations would consist of common borrow or regraded site soils.

A post-closure plan will be developed specifying the inspection, monitoring, and maintenance programs for the closed landfill, to be continued for at least 30 years. Post-closure activities will be reviewed every five years as required by the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) when contamination remains at a site.

Estimated Time for Construction: 4 months

Estimated Time of Operation: 30 years

Estimated Capital Cost: $1,248,000

Estimated Operation and Maintenance Costs (30 years, net present worth): $866,000

Estimated Total Cost (30 years, net present worth): $2,114,000

7.0 OTHER ALTERNATIVES EVALUATED IN THE LF-022 FEASIBILITY STUDY

The public is also invited to comment on the other two alternatives that Plattsburgh AFB evaluated. Each alternative is described briefly below. Detailed descriptions of the alternatives can be found in the FS report located in the Information Repository.

7.1 NO ACTION

The No Action Alternative, Alternative 1 in the FS, serves as a baseline against which the other alternatives can be compared. It assesses the effects on human health and the environment if no remedial actions are taken.

The No Action Alternative consists of a 30-year groundwater monitoring program to inspect ongoing groundwater quality, with five-year reviews to evaluate whether human health and the environment are protected. These evaluations could result in additional remedial actions being instituted.

The No Action Alternative would not meet the response objective described in Section 5.0. Because it does not provide any long-term protection, some ecological receptors would potentially continue to be at risk because of pesticides in LF-022 surface soil. Risks to people would be negligible.

Estimated Time for Construction: immediate

Estimated Time of Operation: 30 years

Estimated Capital Cost: $0

Estimated Operation and Maintenance Costs (30 years, net present worth): $676,000

Estimated Total Cost (30 years, net present worth): $676,000

7.2 INSTALLATION OF A LOW-PERMEABILITY BARRIER COVER SYSTEM

Alternative 3 in the FS is similar to the preferred alternative, except that it includes a gas control system, a special barrier layer, and 42 inches of common borrow in the cover system. It is a low-permeability cover system designed to (1) minimize potential human health and ecological risks associated with surface soil exposures and (2) minimize the amount of precipitation infiltrating to landfilled wastes, subsequently minimizing the potential for contaminants to migrate from wastes to groundwater. Alternative 3 consists of the following components:

(1) Clear and grub the landfill site

(2) Manage surface water runoff to minimize erosion of the final cover and to minimize the maintenance requirements

(3) Install a gas control system

(4) Construct a hydraulic barrier layer consisting of recompacted low-permeability soil or a synthetic liner

(5) Place a barrier protection layer of soil over the low-permeability layer

(6) Install a topsoil cover layer

(7) Establish vegetation to minimize erosion of the final cover and enhance evapotranspiration

(8) Develop a post-closure plan to monitor, maintain, and inspect the site

(9) Monitor groundwater

(10) Conduct five-year site reviews

These components are identical to those of the preferred alternative except for 3, 4, and 5. Under this alternative, a gas detection system would be installed to monitor gas migration beyond the boundaries of the closed landfill. A gas management system within the landfill cover would include venting pipes between a gas-venting soil layer (i.e., the existing soil cover) and the surface.

The barrier layer, placed above the gas-venting layer, would be formed of low-permeability soil (i.e., a recompacted, fine-grained soil such as clay that is difficult to penetrate) or a synthetic liner to keep rainwater or snowmelt from infiltrating the landfill. Over this, a 3.5-foot barrier protection layer would be installed to protect the barrier layer from frost action or from root penetration.

This alternative protects both human and ecological receptors, except for the unlikely possibility that a child might be exposed simultaneously to groundwater and soil in the future.

Estimated Time for Construction: 5 months

Estimated Time of Operation: 30 years

Estimated Capital Cost: $4,196,000

Estimated Operation and Maintenance Costs (30 year, net present worth): $866,000

Estimated Total Cost (net present worth): $5,062,000

8.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

For hazardous waste sites remediated under CERCLA, the USEPA requires that remedial alternatives be evaluated using nine criteria. These criteria are used to select a remedy that meets national Superfund program goals of protecting human health and the environment, maintaining long-term protection, and minimizing untreated waste. Definitions of the nine criteria and a summary of Plattsburgh AFB's evaluation of the alternatives using the nine criteria are provided in the following subsections.

8.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

An assessment is made to identify the extent to which an alternative as a whole

will protect human health and the environment by properly eliminating, reducing, or controlling risks through treatment, engineering controls, or institutional controls.

Alternative 1, the No Action Alternative, contains no remedial measures to protect human health or the environment. Given site conditions, however, human health is not at risk except for the unlikely future situation of a child simultaneously exposed to manganese by drinking the groundwater and to pesticides by ingesting contaminated soil. However, some ecological receptors remain at risk because of exposure to pesticides in surface soils.

Alternatives 2 (the preferred alternative) and 3 similarly protect human health and the environment by covering the landfill's surface — thereby minimizing the chance that people and animals could come into contact with contaminants in LF-022's present surface soil. Again, the only exception is the unlikely future possibility of simultaneous exposures of a child to groundwater and surface soil contaminants.

Alternatives 2 and 3 would both reduce precipitation infiltrating to the landfilled wastes and subsequently reduce the potential for contaminants to migrate from the wastes. The low-permeability barrier layer associated with the Alternative 3 cover system would serve to reduce precipitation infiltration and the potential for contaminant migration from wastes to a greater degree than the Alternative 2 cover system.

8.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Compliance with **Applicable or Relevant and Appropriate Requirements (ARARs)** addresses whether or not a remedy complies with state and federal environmental and human health laws and requirements that apply or are relevant and appropriate to the conditions and remedial options at a specific site.

All of the alternatives comply with provisions of the Clean Air Act, New York Ambient Air Quality Standards, and Occupational Safety and Health Administration regulations.

None of the three alternatives complies with New York State groundwater quality and drinking water standards for iron and manganese. However, the baseline risk assessment indicates that adverse human health effects are unlikely (see Section 4.0).

NYSDEC Solid Waste Management Facility Rules (Part 360) requirements for closure of solid waste landfills are not directly applicable to LF-022 because landfill operations were discontinued prior to the effective date of the regulation (i.e., December 31, 1988). However, Part 360 post-closure requirements for long-term operation and maintenance and site monitoring are relevant and appropriate for closure of LF-022. Alternatives 2 and 3 would comply with the post-closure and long-term monitoring requirements. Alternative 1 would comply with long-term monitoring requirements but would not comply with post-closure requirements.

8.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

Long-Term Effectiveness and Permanence refers to the ability of an alternative to reliably maintain long-range protection of human health and the environment once remedial goals have been met.

Alternative 1 provides the least long-term protection because no remedial measures would be implemented to reduce, eliminate, or control access to contaminated media. Some animals would remain at risk due to exposure to pesticides in LF-022 surface soil.

Alternative 2 provides long-range protection of human health and effectively reduces ecological risks by covering contaminated surface soil with a 12-inch soil barrier and seeding the new topsoil. The cover also would slightly reduce the amount of precipitation reaching the landfilled wastes. The post-closure monitoring program would maintain the cover system.

Alternative 3 provides the greatest long-term effectiveness because the cover system is the least permeable and it reduces the amount of water infiltrating to landfilled wastes the most. Again, the post-closure monitoring program would maintain the cover system.

8.4 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF CONTAMINANTS THROUGH TREATMENT

Essentially, the Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment does not apply to the alternatives evaluated for LF-022 because treatment would not be a principal element. Treatment is a statutory preference under CERCLA; however, it is not always appropriate for landfills such as LF-022. The reduction in the mobility of contaminants through containment is discussed in Subsection 8.3.

8.5 SHORT-TERM EFFECTIVENESS

Short-Term Effectiveness refers to the likelihood of adverse impacts on human health or the environment during the construction and implementation of an alternative until remedial goals are achieved.

No short-term effects are anticipated for Alternative 1 because remedial actions would not be taken; sampling crews would follow applicable health and safety procedures while monitoring groundwater.

Because Alternatives 2 and 3 involve removing existing vegetation and grading the landfill surface, dust containing pesticides could be generated and inhaled by on-site workers and carried downwind. Dust-suppression measures such as water sprays would be used to minimize this. On-site workers would wear protective clothing to minimize contact with surface soil contaminants.

Ecologically, removing trees, shrubs, and other vegetation would temporarily eliminate food sources and protective cover for the wildlife using the site. The final grass cover differs from current vegetation slightly, so the wildlife habitat may be changed, possibly affecting animal populations and community structure.

8.6 IMPLEMENTABILITY

Implementability refers to the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement it.

Alternative 1 would be readily implementable because no remedial actions would be conducted. Alternatives 2 and 3 also are readily implementable, although a suitable borrow source for clay, if clay is used for the low-permeability hydraulic barrier layer, would have to be located before implementation of Alternative 3.

8.7 COST

Cost includes the capital (up-front) cost of implementing an alternative, the costs associated with the operation and maintenance of the alternative over the long term, and the net present worth of the alternative over its period of performance (i.e., 30 years).

The capital, operation and maintenance, and net present worth (i.e., total cost) for each alternative are provided in the descriptions of alternatives in Sections 6.0 and 7.0. Alternative 1 is the least expensive because it involves no remedial actions. Alternative 3 is the most costly of the two cover system alternatives; the increased cost is primarily associated with the low-permeability barrier cover materials.

8.8 STATE ACCEPTANCE

State Acceptance addresses whether, based on its review of the FS and PRAP, NYSDEC concurs with, opposes, or has no comment about the alternative Plattsburgh AFB is proposing as the site remedy.

8.9 COMMUNITY ACCEPTANCE

Community Acceptance addresses whether the public concurs with Plattsburgh AFB's PRAP. Community acceptance of this PRAP will be evaluated based on comments received at the upcoming public meetings and during the public comment period. As discussed, the responses to public comments will be addressed in the form of a Responsiveness Summary that is part of the ROD documenting the selected remedial alternative for LF-022.

8.10 SUMMARY

Of the nine CERCLA criteria, Overall Protection of Human Health and the Environment and Compliance with ARARs are considered threshold requirements that must be met by all remedies. Plattsburgh AFB balances its consideration of alternatives against the following five evaluation criteria:

- long-term effectiveness and permanence
- reductions of toxicity, mobility, or volume through treatment
- short-term effectiveness
- implementability

- cost

State and community concerns are considered modifying criteria factored into a final balancing of all criteria to select a remedy. Consideration of state and community comments may prompt Plattsburgh AFB to modify aspects of the preferred alternative or decide that another alternative provides a more appropriate balance.

The alternative that is protective of human health and the environment, is ARAR-compliant, and affords the best combination of attributes will be identified as the preferred alternative.

9.0 RATIONALE FOR PROPOSING THE PREFERRED ALTERNATIVE

Based on current information and analysis of the FS report, Plattsburgh AFB believes that the preferred alternative for LF-022 is consistent with the requirements of the Superfund law and its amendments, specifically Section 121 of CERCLA, and to the extent practicable, the NCP. Alternative 2 would (1) achieve response objectives by providing overall protection of human health and the environment, (2) provide long-term effectiveness and permanence, and (4) be the least costly of the cover system alternatives. Additionally, Alternative 2 would have less adverse ecological impact if mitigative measures are implemented such as planting trees and shrubs.

GLOSSARY

Administrative Record: A file established and maintained in compliance with Section 113(K) of CERCLA consisting of information upon which the lead agency bases its final decisions on the selection of remedial method(s) for a Superfund site. The Administrative Record is available to the public.

Anaerobic Conditions: The absence of oxygen. An anaerobic process is one from which air or oxygen not in chemical combination is excluded.

Applicable or Relevant and Appropriate Requirements (ARARs): ARARs include any state or federal statute or regulation that pertains to protection of public health and the environment in addressing certain site conditions or using a particular remedial technology at a Superfund site. A state law to preserve wetland areas is an example of an ARAR. USEPA must consider whether a remedial alternative meets ARARs as part of the process for selecting a remedial alternative for a Superfund site.

Bis(2-ethylhexyl)phthalate: A plasticizer used in the manufacturing of plastics.

Carbon Tetrachloride: A colorless, nonflammable toxic liquid used as a solvent and refrigerant.

Chloroform: A colorless, volatile heavy toxic liquid with an ether odor used as a solvent or as a veterinary anesthetic.

Comprehensive Environmental Response, Compensation, and Liability Act (CER-

CLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act requires federal agencies to investigate and remediate abandoned or uncontrolled hazardous waste sites.

Cover System: A multi-layer capping system typically used for closure of landfills. The cover system usually consists of soil materials, sometimes in combination with synthetic materials, one or more of which reduce the flow of water through the cap. The cover system is also graded to promote runoff of rainfall and snowmelt.

DDT: Dichlorodiphenyltrichloroethane is a colorless, odorless, water-insoluble crystalline insecticide that tends to accumulate in ecosystems and has toxic effects on many vertebrates.

Dichlorobenzene: Any of a group of substitution products of benzene and two atoms of chlorine; used as a germicide, insecticide, or chemical intermediate.

Ecological Receptors: Fauna in a given area that could be affected by contaminants in surface soils, surface water, and/or sediment (e.g., mammals, birds, reptiles, fish).

Evapotranspiration: Total water loss from soil, including direct evaporation and transpiration from plants.

Feasibility Study (FS): A report that presents the development and analysis of remedial alternatives that USEPA considers for the remediation of Superfund sites.

Five-year Site Reviews: Reviews of ongoing monitoring, inspection, and maintenance programs conducted at five-year intervals. Five-year site reviews are required for remedial actions that result in hazardous substances, pollutants, or contaminants remaining at the site.

Groundwater: Water found beneath the earth's surface that fills pores between materials such as sand, soil, gravel and cracks in bedrock and often serves as a principal source of drinking water.

Grub: To clear by digging up roots and stumps.

Inorganic Compounds: A class of naturally occurring compounds that includes metals, cyanide, nitrates, sulfates, chlorides, carbonate, bicarbonate, and other oxide complexes.

Installation Restoration Program (IRP): The IRP is the U.S. Air Force subcomponent of the Defense Environmental Restoration Program (DERP) that specifically deals with investigating and remediating sites associated with suspected releases of toxic and hazardous materials from past activities. The DERP was established to clean up hazardous waste disposal and spill sites at Department of Defense facilities nationwide.

Institutional Controls: Limitations such as deed or zoning restrictions established to restrict use of a contaminated area and reduce the potential for exposure (e.g., deed restrictions to prevent the future installation of drinking water wells at a site with contaminated groundwater).

Long-term Monitoring: Collecting and analyzing environmental samples from specific media (e.g., surface soils, sediments, surface water, groundwater, and/or air) to monitor quality according to a specified schedule and duration, such as a 30-year period.

Low-Permeability: Permeability is the property of soil that measures the ability of water to pass through. A low-permeability soil would therefore allow a limited amount of water to pass through it.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The NCP provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants. The NCP is required under CERCLA and the Clean Water Act and USEPA has been delegated the responsibility for preparing and implementing the NCP. The NCP is applicable to response actions taken pursuant to the authorities under CERCLA and the Clean Water Act.

National Priorities List: USEPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program.

Net Present Worth: The amount of money necessary to secure the promise of future payment, or series of payments, at an assumed interest rate.

Petroleum Hydrocarbons (PHCs): The mixture of hydrocarbons and small amounts of other substances that make up petroleum. Hydrocarbons are chemical compounds consisting of carbon and hydrogen, and are found in gasoline, naphtha, and other products produced by refining processes.

Post-Closure Plan: A plan specifying the maintenance, monitoring, and inspection activities to be conducted for a specified period at a hazardous waste site such as a landfill after it has been closed.

Preliminary Assessment: The first stage of the IRP process which is conducted to identify potential hazardous waste sites.

Proposed Remedial Action Plan (PRAP): A public document that solicits public input on a recommended remedial alternative to be used at a National Priorities List (NPL) site. The PRAP is based on information and technical analysis generated during the RI/FS. The recommended remedial action could be modified or changed based on public comments and community concerns.

Record of Decision (ROD): A public document that explains the remedial alternative to be used at a National Priorities List (NPL) site. The ROD is based on information and technical analysis generated during the Remedial Investigation and Feasibility Study, and on consideration of the public comments and community concerns received on the PRAP. The ROD includes a Responsiveness Summary of public comments.

Remedial Action: A long-term action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to human health or the environment.

Remedial Alternatives: Options evaluated to address the source and/or migration of contaminants to meet health based remediation goals.

Remedial Investigation (RI): The Remedial Investigation determines the nature and extent and composition of contamination at a hazardous waste site, and directs the types of remedial options that are developed in the Feasibility Study.

Site Inspection (SI): The SI is the second stage of the IRP process which is conducted to confirm the presence or absence of contamination at a site.

Source: Area at a hazardous waste site from which contamination originates.

Superfund: CERCLA created a special tax that goes into a Trust Fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program, USEPA either: (1) pays for site remediation when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work or (2) takes legal action to force parties responsible for site contamination to clean up the site or pay back the federal government for the cost of the remediation. Federal facilities are not eligible for Superfund monies.

Terrestrial Wildlife: Animals living on land (e.g., reptiles, small mammals, small birds, predatory mammals, predatory birds).

TABLE 1
LF-022 SITE CONTAMINANTS BY MEDIA

DETECTION	CONCENTRATION RANGE[1] MINIMUM	MAXIMUM	FREQUENCY OF DETECTION[2]
GROUNDWATER (µg/L)			
Iron	<100[3]	8,760	3/12
Manganese	<15	877	6/12
SURFACE SOILS[4] (µg/kg)			
DDD	<16	16,000	2/4
DDE	<16	855	1/4
DDT	<16	3,505	2/4
SUBSURFACE SOILS (mg/kg)			
Lead	4.1	116	2/3
WASTE (mg/kg, unless otherwise noted)			
Carbon tetrachloride	<5	18,000	1/7
Chloroform	<5	19,000	1/7
Bis(2-Ethylhexyl)Phthalate (µg/kg)	<300	1,700	1/2
PHCs	<1	2,100	5/6
Aluminum	<40	128,000	3/7
Cadmium	<1	151	3/7
Chromium	<10	412	1/7
Copper	<5	5,150	3/7
Iron	140	130,500	2/7
Lead	<1	974	4/7
Manganese	<3	7,365	1/7
Silver	<2	18	3/7
Sodium	<1000	23,300	1/7
Zinc	18	33,300	5/7

Notes:

1 Concentrations of duplicate samples were averaged.

2 Number of samples in which the compound was detected above background concentrations or appropriate standards divided by the total number of samples analyzed for that parameter. Duplicate samples represent one sample.

3 <100 denotes that the minimum sample concentration was below the identified Contract Required Quantitation Limit (e.g., 100 µg/kg).

4 Concentrations detected in composite samples.

DDD - Dichlorodiphenyldichloroethane
DDE - Dichlorodiphenyldichloroethene
DDT - Dichlorodiphenyltrichloroethane
PHC - Petroleum Hydrocarbons, as detected by USEPA method 418.1